

REMARKS

Reconsideration and allowance of the subject application are respectfully solicited.

Claims 12 and 14 through 22 are pending, with Claim 12 being independent. The specification has been amended.

Claims 12 and 14 through 22 were variously rejected under 35 U.S.C. § 103 over newly-cited US 2003/0070581 A1 (Tomioka, et al.) in view of previously-cited US 5,990,227 (Takizawa, et al.), EP 1243624 A1 (“EP ‘624”), and US 6,511,534 B1 (Mishina, et al.). All rejections are respectfully traversed.

Claim 12 recites, *inter alia*, that each of the liquid compositions comprises a functional substance, an amphiphilic block copolymer, and a liquid medium, with a pH and a pKa of an organic acid group or a salt of the organic acid group of the copolymer of the first liquid composition being different than a pH and a pKa of an organic acid group or a salt of the organic acid group of the copolymer of the second liquid composition, with conditions (i)-(iv) satisfied including (iii) that the organic acid of the copolymer of the second liquid composition is a sulfonic acid.

(Applicants wish to provide the following technical comments explaining a mechanism of contact of the liquid compositions. Before the contact, a micelle composed of the block copolymer of the first liquid composition has an organic acid or a salt of the organic acid as a hydrophilic group and is dissociated ionically, whereby the micelles are ionically repulsed from each other to prevent the interaction between the micelles. As a result, the viscosity is low and the micelles are dispersed sufficiently. On the other hand, the organic acid of the block copolymer of the second liquid composition which is smaller than the first one in pH is a sulfonic

acid, and, has the smaller pKa than that of the first one so that the second one is sufficiently dissociated ionically and has a low viscosity to disperse sufficiently. In particular, since the polymer is a block copolymer having a sulfonic group, the micelles comprised of the block copolymer are ionically repulsed from each other to prevent the interaction and make the sufficient dispersion. When contacting the first liquid composition with the second one, the pH of the first liquid composition shifts to the acidic end because the second liquid composition has a lower value of pH and has a sulfonic group. As a result, the hydrophilic group in the first liquid composition is neutralized to prevent the repulsion between the micelles consisting of the block copolymer but the interaction therebetween is enforced to act between the micelles strongly, whereby the viscosity of the first liquid composition increases. (See the description on page 21, line 10 through page 24, line 10, and working examples of the specification.) The method for applying the liquid of the present invention thus has an advantageous effect of dispersing sufficiently the micelles of the first and second liquid compositions before the contact and increasing the viscosity of the first liquid composition after the contact because of the synergism of the relations of pH and pKa of the first and second liquid compositions and the existence of sulfonic acid group in the second one. In this regard, both of the liquid compositions to be contacted in the present invention have their respective block copolymers, which makes possible the sufficient dispersion of micelles of the first and second liquid compositions before the contact and the increase of viscosity of the first one after the contact through the above mechanism. This is clear by the comparison of Example 5, the polymer of which is a block copolymer, and Comparative Example 3, the polymer of which is a random copolymer, of the present specification. That is, while any blurring between ink patterns in Example 5 is

restrained, such a blurring is generated in Comparative Example 3. The present invention, thus, increases the viscosity of the first liquid composition after the contact by means of employing the block copolymer as the polymer as well as prescribing pH and pKa of the first and second ones.)

However, Applicants respectfully submit that none of Tomioka, et al., Takizawa, et al., EP '624, and Mishina, et al., even in the proposed combinations, assuming, *arguendo*, that such could be combined, discloses or suggests at least the above-discussed combination of claimed features as recited, *inter alia*, in Claim 12.

As acknowledged by the Official Action, Applicants respectfully submit that Tomioka, et al. is devoid of any disclosure or suggestion that its liquid compositions have an amphiphilic block copolymer and that the organic acid of the amphiphilic block copolymer of the second liquid composition is a sulfonic acid as claimed. Applicants respectfully submit that Tomioka, et al. mentions, e.g., sulfonic acid at [0139]; however, the sulfonic acid in Tomioka, et al. is, however, used as a mere acid for adjusting pH of the liquid composition (see [0138]) and there is no suggestion whatsoever that the sulfonic acid could or should be used as an organic acid of an amphiphilic block copolymer as claimed.

The Official Action relies upon Takizawa, et al. for its description of an amphiphilic block copolymer, but Applicants wish to point out that Takizawa, et al. too is silent at least as to any description or suggestion that the amphiphilic block copolymer has a sulfonic acid group as the organic acid as claimed.

Indeed, Applicants respectfully submit that even if, *arguendo*, that amphiphilic block copolymer of Takizawa, et al. could be added to Tomioka, et al., the resultant would *not* become the constitution of the present invention; to the contrary, if a sulfonic acid were to have been

added under a condition that a block copolymer had formed micelles, the micelles would have been aggregated so that it would have become very difficult to disperse the micelles sufficiently.

Applicants respectfully submit that the remaining applied documents, EP '624 and Mishina, et al., fail to remedy the deficiencies of Tomioka, et al. and Takizawa, et al.

Applicants also submit that there has been no showing of any indication of motivation in the cited document that would lead one having ordinary skill in the art to arrive at the above-discussed claimed features.

The dependent claims are also submitted to be patentable because they set forth additional aspects of the present invention and are dependent from independent claims discussed above. Therefore, separate and individual consideration of each dependent claim is respectfully requested.

Applicants submit that this application is in condition for allowance, and a Notice of Allowance is respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should to be directed to our below listed address.

Respectfully submitted,

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